

\* \* \* FACSIMILE MESSAGE \* \* \*

CBI TECHNICAL SERVICES  
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FAX NUMBER IS: 815 439 6011  
VERIFY NUMBER IS: 815 439 6322

PAGE: 1 OF: 5

DATE: August 2, 1994

TO: Larry Jones  
Caltech

FAX NO.: 818/304-9834

FROM: Warren A. Carpenter  
Process Engineering Department  
CBI Technical Services Co.

RE: OUTGAS TEST PROCEDURE  
LIGO QUALIFICATION TEST  
FACILITY  
930212 File # 2.2.5

Is this what you expected the procedures including the state vectors to look like? It seems confusing and broken up to me. I think that a spreadsheet at the end of the document will be a better choice. The last two pages are copies of half of the 11" x 17" spreadsheet.

Regards,

Warren A. Carpenter  
Senior Engineer



CBI PROPRIETARY

IDENTIFICATION OUTGAS			
REFERENCE NO. 930212		SHT 3 OF 14	
OFFICE RCE		REVISION 1	
MADE BY WAC	CHKD BY MLT	MADE BY WAC	CHKD BY PM
DATE 3/14/94	DATE 3/14/94	DATE 7/22/94	DATE 7/22/94

TITLE	QUALIFICATION TEST PUMPDOWN, BAKE OUT AND OUTGASSING TEST PROCEDURE
PRODUCT	LIGO BEAM TUBE MODULES QUALIFICATION TEST CALIFORNIA INSTITUTE OF TECHNOLOGY

**3.2 Pump Down Procedure**

V-1	V-2	V-3	V-4	V-5	V-7	V-8	V-9	V-10	V-11	V-12	V-14	V-15		
1	0	1	1	1	0	0	0	0	1	0	0	1		
V-19	V-25	V-26	V-27	V-28	V-29									
0	0	0	0	0	0									
RGA	TMP-1	TMP-2	TMP-3	RP-1	RP-2	LNT-1	LNT-2	LNT-3	CC-1	CC-2	CC-3	CC-4	CC-5	CC-6
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start roughing pump RP-1 and allow the unit to warm up for 10 minutes.

V-1	V-2	V-3	V-4	V-5	V-7	V-8	V-9	V-10	V-11	V-12	V-14	V-15		
1	0	1	1	1	0	0	0	0	1	0	0	1		
V-19	V-25	V-26	V-27	V-28	V-29									
0	0	0	0	0	0									
RGA	TMP-1	TMP-2	TMP-3	RP-1	RP-2	LNT-1	LNT-2	LNT-3	CC-1	CC-2	CC-3	CC-4	CC-5	CC-6
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

Slowly open valve V-7 and V-9.

V-1	V-2	V-3	V-4	V-5	V-7	V-8	V-9	V-10	V-11	V-12	V-14	V-15		
1	0	1	1	1	1	0	1	0	1	0	0	1		
V-19	V-25	V-26	V-27	V-28	V-29									
0	0	0	0	0	0									
RGA	TMP-1	TMP-2	TMP-3	RP-1	RP-2	LNT-1	LNT-2	LNT-3	CC-1	CC-2	CC-3	CC-4	CC-5	CC-6
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

The beam tube and pumping system shall be evacuated until the pressure reaches 0.1 torr. The high vacuum turbomolecular pump (TMP-1) shall now be started.

V-1	V-2	V-3	V-4	V-5	V-7	V-8	V-9	V-10	V-11	V-12	V-14	V-15		
1	0	1	1	1	1	0	1	0	1	0	0	1		
V-19	V-25	V-26	V-27	V-28	V-29									
0	0	0	0	0	0									
RGA	TMP-1	TMP-2	TMP-3	RP-1	RP-2	LNT-1	LNT-2	LNT-3	CC-1	CC-2	CC-3	CC-4	CC-5	CC-6
0	1	0	0	1	0	0	0	0	0	0	0	0	0	0

The cold cathode gage CC1 will be automatically activated by a set point from pirani gage P1, however, the other cold cathode gages must be started manually. Gage CC2 may be manually operated only when CC1 operates. CC3 may be operated only when TMP-3 is at full speed. CC4



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V-1	V-2	V-3	V-4	V-5	V-7	V-8	V-9	V-10	V-11	V-12	V-14	V-15		
1	0	1	1	1	0	0	0	0	1	0	0	1		
V-19	V-25	V-26	V-27	V-28	V-29									
0	0	0	0	0	0									
RGA	TMP-1	TMP-2	TMP-3	RP-1	RP-2	LNT-1	LNT-2	LNT-3	CC-1	CC-2	CC-3	CC-4	CC-5	CC-6
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start roughing pump RP-1 and allow the unit to warm up for 10 minutes.

V-1	V-2	V-3	V-4	V-5	V-7	V-8	V-9	V-10	V-11	V-12	V-14	V-15		
1	0	1	1	1	0	0	0	0	1	0	0	1		
V-19	V-25	V-26	V-27	V-28	V-29									
0	0	0	0	0	0									
RGA	TMP-1	TMP-2	TMP-3	RP-1	RP-2	LNT-1	LNT-2	LNT-3	CC-1	CC-2	CC-3	CC-4	CC-5	CC-6
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

Slowly open valve V-7 and V-9.

V-1	V-2	V-3	V-4	V-5	V-7	V-8	V-9	V-10	V-11	V-12	V-14	V-15		
1	0	1	1	1	1	0	1	0	1	0	0	1		
V-19	V-25	V-26	V-27	V-28	V-29									
0	0	0	0	0	0									
RGA	TMP-1	TMP-2	TMP-3	RP-1	RP-2	LNT-1	LNT-2	LNT-3	CC-1	CC-2	CC-3	CC-4	CC-5	CC-6
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0

The beam tube and pumping system shall be evacuated until the pressure reaches 0.1 torr. The high vacuum turbomolecular pump (TMP-1) shall now be started.

V-1	V-2	V-3	V-4	V-5	V-7	V-8	V-9	V-10	V-11	V-12	V-14	V-15		
1	0	1	1	1	1	0	1	0	1	0	0	1		
V-19	V-25	V-26	V-27	V-28	V-29									
0	0	0	0	0	0									
RGA	TMP-1	TMP-2	TMP-3	RP-1	RP-2	LNT-1	LNT-2	LNT-3	CC-1	CC-2	CC-3	CC-4	CC-5	CC-6
0	1	0	0	1	0	0	0	0	0	0	0	0	0	0

The cold cathode gage CC1 will be automatically activated by a set point from pirani gage P1, however, the other cold cathode gages must be started manually. Gage CC2 may be manually operated only when CC1 operates. CC3 may be operated only when TMP-3 is at full speed. CC4 may be operated only when TMP-2 is running at full speed. CC5 may be operated only when V-4 is open and CC1 is operating. CC6 may be operated only if V-4 is open and CC1 is operating or



